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ABSTRACT

The process of transferring agricultural technology in many countries was studied to determine the perceived educational and financial needs of small-scale dairy farmers in Socopo, Venezuela. The following data were collected: (1) demographic characteristics--age, educational level, farm size, number of lactating cows, dairy farming experience, and family income; (2) perceived educational and financial needs; (3) sources of obtaining technical information and frequency of use; (4) teaching techniques; and (5) relationships between the demographic characteristics and perceived educational and financial needs. Data for the descriptive correlational study were collected through personal interviews (N=137). Descriptive statistics were used to accomplish study objectives. Study findings included the following: (1) there is a discrepancy in terms of educational needs in dairy farm management activities; (2) educational programs for farmers should be based on identified needs, not farmer characteristics; (3) farmers need the most financial help in forages and livestock areas; (4) farmers preferred veterinarians, county extension agents, and neighbors as information sources; and (5) farmers preferred interpersonal teaching techniques over mass media techniques. (NLA)

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Summary of Research

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Assessing the Educational and Financial Needs of Small-Scale Dairy Farmers in Socopo, Venezuela

Ruben D. Nieto and Janet L. Henderson

Introduction

A need exists when there is a gap or discrepancy between "what is" and "what should be" in terms of results. Needs assessment research concurs that educational programs must begin by identifying the needs and interests for the audience the programs will serve. The potential learners should be involved in the needs identification process to insure that the educational program will have the learners' acceptance. Through needs assessment, gaps or discrepancies between the "what is" and the "what should be" can be determined. A needs assessment model, developed by Borich (1980) and validated by other researchers, has been used to accurately measure educational needs. Studies dealing with educational needs have demonstrated that certain demographic characteristics of the learners influence their educational needs. Knowing the learners' preferences of sources for obtaining technical information and teaching techniques help extension educators in designing and implementing educational programs.

The process of transferring agricultural technology in many countries has been inefficient (*Administracion operativa*, 1988). Educational and financial programs are not based on the potential audience for whom the programs will serve. Generally, the needs of small-scale farmers are not identified and farmers are not involved in extension education program planning. The educational and financial needs of small-scale farmers must be assessed in designing and implementing effective educational programs.

Purpose of Study and Objectives

The main purpose of this study was to determine the perceived educational and financial needs of small-scale dairy farmers in Socopo, Venezuela. A small-scale dairy farmer in the context of the study was defined as any person having farming as his or her primary source of income, whose farm is located on government land, living on the farm, and using family members as the most common source for labor.

The major objectives of the study were to:

1. Identify demographic characteristics of the small-scale dairy farmers: age, educational level, farm size, number of lactating cows, dairy farming experience, and family income.

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2. Determine the perceived educational and financial needs of the farmers.

3. Determine the preferred sources of obtaining technical information and preferred frequency of use of these sources by the farmers.

4. Determine the farmers' preferences for the teaching techniques used by extension educators.

5. Determine the relationships between demographic characteristics of small-scale dairy farmers and their perceived educational and financial needs, preferred sources of obtaining technical information and frequency of use, and their preferences for the teaching techniques used by extension educators for presenting technical dairy information.

Methodology

A descriptive correlational study was designed to determine the perceived educational and financial needs of dairy farmers. Small-scale dairy farmers in the Socopo region of Venezuela were the target population for the study. An accessible population of 210 small-scale dairy farmers was determined. A non-probabilistic sampling procedure was employed. A purposive stratified sample was chosen across the seven subareas in Socopo. One hundred thirty-seven farmers were interviewed based on their location (representing proportionally the seven subareas in Socopo) and on their availability and willingness to assist with the study.

A face-to-face interview was the most appropriate survey method to use in the study since the majority of the farmers had low educational levels. The instrument employed in the study was developed by the researchers. A panel of experts consisting of faculty, graduate students, and agricultural technicians determined the content validity of the instrument in both English and Spanish languages. Reliability coefficients of section two of the instrument were calculated using Cronbach's alpha (r = .98 and .99). The final version of the instrument consisted of four sections.

Section one contained six questions assessing selected demographic characteristics of the small-scale farmers. Section two was subdivided into educational and financial needs. The educational needs part consisted of 66 items that measured the perceived educational needs of the 137 farmers in nine selected areas dealing with dairy farm management activities. Perceived educational needs were calculated through the use of the indirect approach to measure people's perceptions recommended by Borich (1980). The Borich Model consists of determining need scores (Cal En) by subtracting the perceived knowledge score (Kn) from the perceived importance score (In), and then multiplying the result by the perceived average importance (Ig). The following formula represents the Borich model: Cal En = (In-Kn) (Ig). Responses to the perceived importance and knowledge were rated on a five-point Likert scale, from low to high. The financial needs part consisted of 21 items that measured the perceived financial needs of the farmers in six areas regarding the most common items funded by the farm credit institutions in the long-term dairy cattle credit programs. Respondents rated directly their perceived financial needs using a five-point Likert scale, from low to high.

Section three consisted of a checklist of seven common sources of obtaining dairy cattle information by dairy farmers. Farmers were asked to indicate the sources they use for obtaining dairy cattle information. In addition, farmers had to place in

rank order the top three sources of information they rely on the most to obtain technical diary information and the preferred frequency of use of these sources of information. Section four of the instrument consisted of a list of the most common teaching techniques used by Extension educators. Farmers rated their preferences on each teaching technique using a four-point Likert scale, from low to high.

Data for the study were collected through personal interviews. The researcher trained three assistants as interviewers to help with data collection. The 137 farmers were asked the same questions and in the same order. Data were gathered in a period of 12 days during April 1989.

Descriptive statistics were used to accomplish the five objectives of the study. Statistics employed included: frequencies, percentages, measures of central tendency, measures of variability and correlation coefficients.

Findings

Selected Demographic Characteristics

The farmers interviewed were between the ages of 17 and 78 years. The mean age of the respondents was 49 years. Forty percent of the farmers who participated in the study had no formal schooling. The median level of education for the farmers was second grade. A relatively small proportion of the respondents, 1%, had a college education. Nineteen percent of the respondents had received some type of non-formal education (i.e., courses, seminars, workshops related to dairy). The farm size of the respondents was between 5 and 420 hectares. The median farm size of the respondents was 60 hectares. Sixty percent of the farmers interviewed had between 10-29 years of experience in dairy farming activities. The average dairy farming experience of the respondents was 18 years. Data from the study indicated that the farmers own between 5 and 130 cows, with a median of 20 cows. Seventy-seven percent of the respondents had between $600 - $5,800 of gross dairy income per year, with a median of $3,200 per year. Forty-two percent of the farmers interviewed had a gross annual supplementary income between $1,950 - $5,800 with a median of $2,200 per year.

Educational Needs

Findings from the study revealed that the calculated educational needs of the nine areas of dairy farm management activities were ranked by the respondents in the following descending order: a) forages, b) herd health, c) reproduction, d) general management practices, e) feeding, f) financial management, g) selection, h) record keeping, and i) housing and handling.

Table 1 reports the rank orders, means, and standard deviations of the top 10 educational needs for the Socopo small-scale dairy farmers. As illustrated in this table, one-half of the top 10 items focused on herd health concerns.

Financial Needs

Table 2 shows the rank orders, means, and standard deviations of the top 10 items of the perceived financial needs of Socopo dairy farmers. Six of the top financial needs focused on pasture management activities and herd improvement.

Sources of Information

The Socopo dairy farmers involved in the study were asked to indicate the most

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Table 1

Rank Order of the Top 10 Educational Needs as Perceived by Small-Scale Dairy Farmers in Socopo, Venezuela n = 137

Items	Rank	Mean	S.D.
Select high quality seed	1	8.04	4.98
Recognize typical health problems for dairy cattle	2	7.80	4.72
Keep complete breeding records	3	7.35	4.79
Ability to operate farm machinery	4	7.33	4.89
Prevent carbon	5	7.18	4.85
Prevent brucellosis	5	7.18	5.06
Determine control methods for grass insects	6	7.05	4.48
Prevent aftosa fever	7	6.97	4.66
Prevent mastitis	8	6.96	4.84
Determine amount of fertilizer needed	9	6.92	5.09

Note: Maximum need score=8.04, Minimum need score=1.95

common sources of obtaining dairy cattle information. Farmers also were asked to place in rank order the three top sources of information they rely on the most to obtain technical dairy information. The respondents ranked their top three preferences for sources of information in the following descending order: a) veterinarian, b) county agent, and c) neighbors. The data also revealed that the respondents would prefer

Table 2

Rank Order of the Top 10 Financial Needs as Perceived by Small-Scale Dairy Farmers in Socopo, Venezuela n = 137

Item	Rank	Mean	S.D.
Introduction of improved grazing forages	1	4.01	1.08
Fertilization of current pastures	2	3.98	1.03
Building or repairing fences	3	3.50	1.24
Acquisition of sires	4	3.36	1.21
Acquisition of heifers	5	3.34	1.09
Acquisition of tractor with accessories	6	3.26	1.66
Building or repairing dairy barn	7	3.24	1.42
Introduction of harvested forages	8	3.23	1.22
Building or repairing corral	9	3.21	1.43
Acquisition of cows	10	2.71	1.51

Note: Items were rated using the following scale: None = 1, Slight = 2, Some = 3, Much = 4, and Very Much = 5.

to use the veterinarian and county Extension agents as sources of information at least once a month and neighbors and relatives at least once a week. On the other hand, the credit supervisor is the source of information that they would prefer to contact least often.

Teaching Techniques

The respondents were asked to rate their preferences for the different teaching techniques used by the Extension agents to inform people about dairy farming practices. The respondents ranked demonstrations, farm visits, and field trips as the most preferred teaching techniques. On the other hand, office visits, workshops, and state meetings were rated as the least preferred teaching techniques.

Relationships Among Characteristics of Interest in the Study

Negligible to low associations were found among the demographic characteristics of the farmers and the perceived educational need scores in dairy farm management activities. There were negligible to moderate associations between selected demographic characteristics and perceived financial needs. As illustrated in Table 3, among the moderate associations found were a) farmers with higher levels of formal education tend to have higher financial needs related to machinery and equipment in their farm operations ($r = .34$); b) farmers with less dairy farming experience tend to have higher financial needs related to technical assistance ($r = -.39$); and c) as level of dairy income increases, financial needs related to infrastructure tend to decrease ($r = -.30$).

Demographic characteristics tend to be independent of the sources for obtaining technical dairy information farmers use and their preferred frequency of use of these sources, except between years of experience and neighbors, in which there is a moderate negative association. Farmers with less farming experience tend to select neighbors as the source for obtaining technical information ($r = -.31$).

Most of the associations between selected demographic characteristics and preferred teaching techniques were negligible, except between age and level of education

Table 3

Relationships Between Selected Demographic Characteristics of Small-Scale Dairy Farmers and the Six Areas of Financial Needs n=137

Area of Financial Needs	Correlation Coefficients (R) Age	Years Exp.	Formal Education	Dairy Income
Livestock	-.03	.20	.02	-.18
Forages	.07	-.08	-.14	-.13
Water Supply	-.04	-.24	.01	-.02
Infrastructure	.06	-.14	-.13	-.30
Machinery & Equipment	-.19	-.23	.34	.13
Technical Assistance	-.18	-.39	.17	.14

with field trips which were moderate associations. Younger farmers with higher levels of formal education are more likely to select field trips as a preferred teaching technique (r = -.31).

Conclusions, Implications, and Recommendations

Findings from this study revealed that there is a discrepancy or gap between "what is" and "what should be" in terms of educational needs in dairy farm management activities for the dairy farmers. According to the needs assessment model developed by Borich (1980), those gaps or discrepancies with the highest positive differences resulting from the calculated educational need scores are the highest educational needs.

Educational Needs

Data from the study indicated that the dairy farmers have educational needs in the nine areas dealing with dairy farm management. These findings go beyond demographic characteristics and inventories typically reported by other studies conducted in the area. For instance, Pourraid (1982) identified the major problems of the Socopo area dairy farmers, however, he did not arrange the problems in priority order.

From the findings of this study, the researchers conclude that the greatest needs for educational programs for success in a dairy farm operation are in three production-oriented areas; a) forages, b) herd health, and c) reproduction. A possible explanation for the high ranking of these three areas is that dairy farmers know that high milk yields are directly associated with good quality forages, a healthy dairy herd, and high conception rates. Extension agents should consider these three topics when developing specific educational programs for the area.

On the other hand, selection, record keeping, and housing and handling, which are management-oriented areas, were ranked as the areas in which the dairy farmers need less education. A possible interpretation of the low ranking for the area housing and handling is that most of the farmers have experience in designing and constructing dairy farm infrastructure. A possible explanation for the low ranking of record keeping is that most of the respondents have low levels of education. A detailed, written record keeping system would be difficult to implement. There is a tendency for farmers to be negative towards keeping farm records. Extension programming should consider these low ranked areas in the educational programs for farmers, especially in the area of record keeping. Educational programs on record keeping should be addressed in a way farmers can understand the importance of this topic in a dairy farm operation.

Findings from the study revealed that the selected demographic characteristics of the dairy farmers who participated in the study are independent of the educational need scores. Based upon the educational need scores determined in this study, Extension educators should develop educational programs for the farmers based on identified needs not on the characteristics of the farmers. Educational programs could have a wide range of audiences (i.e., young and old farmers, farmers with high and low levels of education, farmers with high and low levels of income, etc.)

Financial Needs

Forages and livestock areas were identified as the two areas in which the dairy farmers need the most financial help by the farm credit institutions. Dairy farm-

ers may understand that with the introduction of improved forages and livestock their dairy farm operations would improve considerably. Forages and livestock are two of the major investments that a farmer needs to make in a dairy farm operation. Subsequently, farm credit institutions must consider these financial needs when developing farm dairy cattle credit programs for the area.

On the other hand, water supply and technical assistance are the two areas in which the dairy farmers need the least financial help by the farm credit institutions. Water supply in the Socopo area is provided by two rivers of sufficient and permanent water flow. In addition, the growth of other crops which require irrigation systems are limited in the area. Since the farmers receive free assistance programs from the government through the Extension service, they may not consider other types of technical assistance programs that are available. Therefore, small-scale farmers may not perceive technical assistance as an important input in their dairy farm operation.

Technical Dairy Information

Findings from this study revealed that the dairy farmers preferred the veterinarian, the county Extension agent and neighbors as the sources for obtaining technical dairy information. Some of these findings are in agreement with Onucha, cited by Shibah (1983), Knight (1970), and Tiwary (1979) on preferred sources for obtaining technical information in which the county Extension agent, neighbors, and veterinarian were ranked as farmers' highest preferences. A probable explanation of the high preference for the veterinarian as a source of information is that small-scale dairy farmers frequently use the services of a veterinarian (e.g., dairy herd health problems, selling of old cows to slaughterhouse, calving problems). In addition, there is a belief in small-scale dairy farmers that the veterinarian is able to solve all their problems (e.g., dairy herd health, forages, administration). Extension educators should create educational programs in which small-scale farmers can understand that agronomists, agricultural economists and other agriculturalists are professionally prepared to solve some of the problems in dairy farm operations. For instance, educational programs covering the topics included in the forage area should be taught by agronomists since they have the expertise for teaching this subject matter instead of veterinarians.

Demographic characteristics of the dairy farmers tend to be independent of the sources of information and frequency of use of these sources, except between years of experience and neighbors, where a negative moderate association existed. In concordance with Roger (1983) adopted categorization, inexperienced farmers might fall in the late majority group, which are characterized for consulting their peers before adopting new technical information. Therefore, neighbors would be the first source for obtaining information. Local leader farmers should be used more frequently to transmit technical dairy information. For instance, on-farm demonstrations should be set in local farmers operations owned by local leaders.

Teaching Techniques

The findings on preferred teaching techniques are in concordance with Riesenberg and Gor's findings (1989) that Idaho farmers preferred interpersonal teaching techniques (i.e., on-farm demonstrations, tours, and field trips) over mass media techniques (i.e., publications, home study, and computer-assisted instruction). A probable explanation of these findings is

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that most of the dairy farmers prefer personal contact with the Extension educator close to their farm operation rather than ma media teaching techniques and/or mee ngs far from their farm operations. Extension agents should consider the preferred teaching techniques of these farmers when designing and implementing the educational programs for the area.

Need for Further Study

Needs assessment is a first step in planning educational programs for farmers. Extension program development involves many activities that must be addressed by researchers and Extension agents. While findings from this study will only be helpful to the extent they are used to develop relevant educational programs for farmers in the target area, the results can be used as comparative data for future needs assessment research by Extension educators. Although this study focused on a specific geographical area in Venezuela and on a specific commodity, the research can be used as an example for other needs assessment studies. As a case study, the research documents the importance of and procedures for assessing farmer needs.

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SUMMARY OF RESEARCH

The process of transferring agricultural technology in many countries has been inefficient. Educational and financial programs are not based on the potential audience for whom the programs will serve. Generally, the needs of small-scale farmers are not involved in extension education program planning. This study reports research which determines the perceived educational and financial needs of small-scale dairy farmers in Socopo, Venezuela. It should be of interest to individuals contemplating similar work in other countries.

This summary is based on a thesis by Ruben D. Nieto under the direction of Janet L. Henderson. Ruben D. Nieto is a graduate student in the Department of Agricultural Education at The Ohio State University and is currently pursuing a Ph.D. degree. Dr. Henderson is an Associate Professor, Department of Agricultural Education, The Ohio State University. Special appreciation is due to Jacquelyn Deeds, Mississippi State University; Eddie Moore, Michigan State University; and Rosemarie Rossetti, The Ohio State University for their critical review of the manuscript prior to publication.

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